Title: REMOTE CONTROL DEVICE FOR VEHICLES
Inventor's Name: Shinichi UEDA et al
Application No.: New Application
Docket No.: 025416-00005

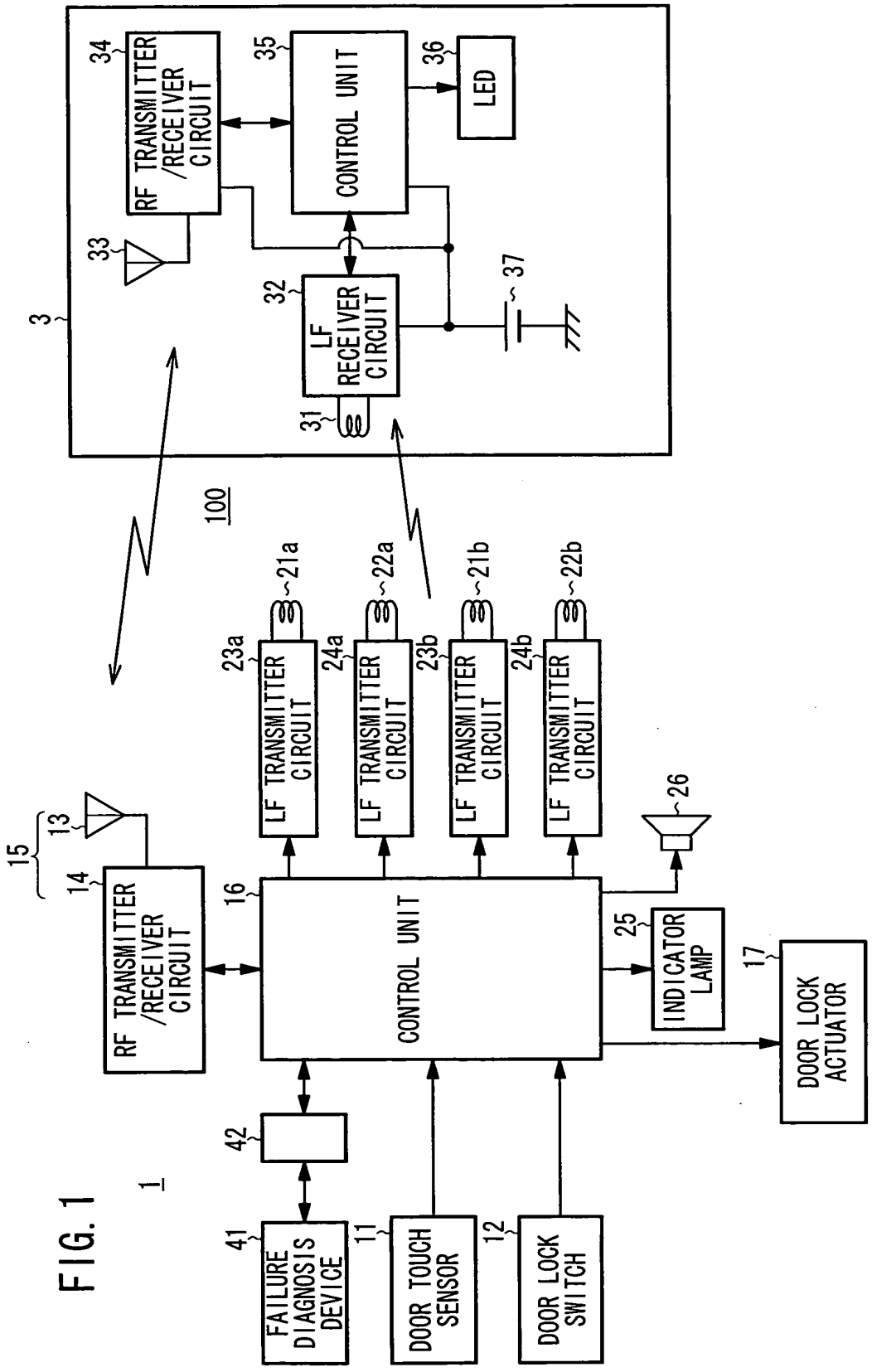


FIG. 1

FIG. 2

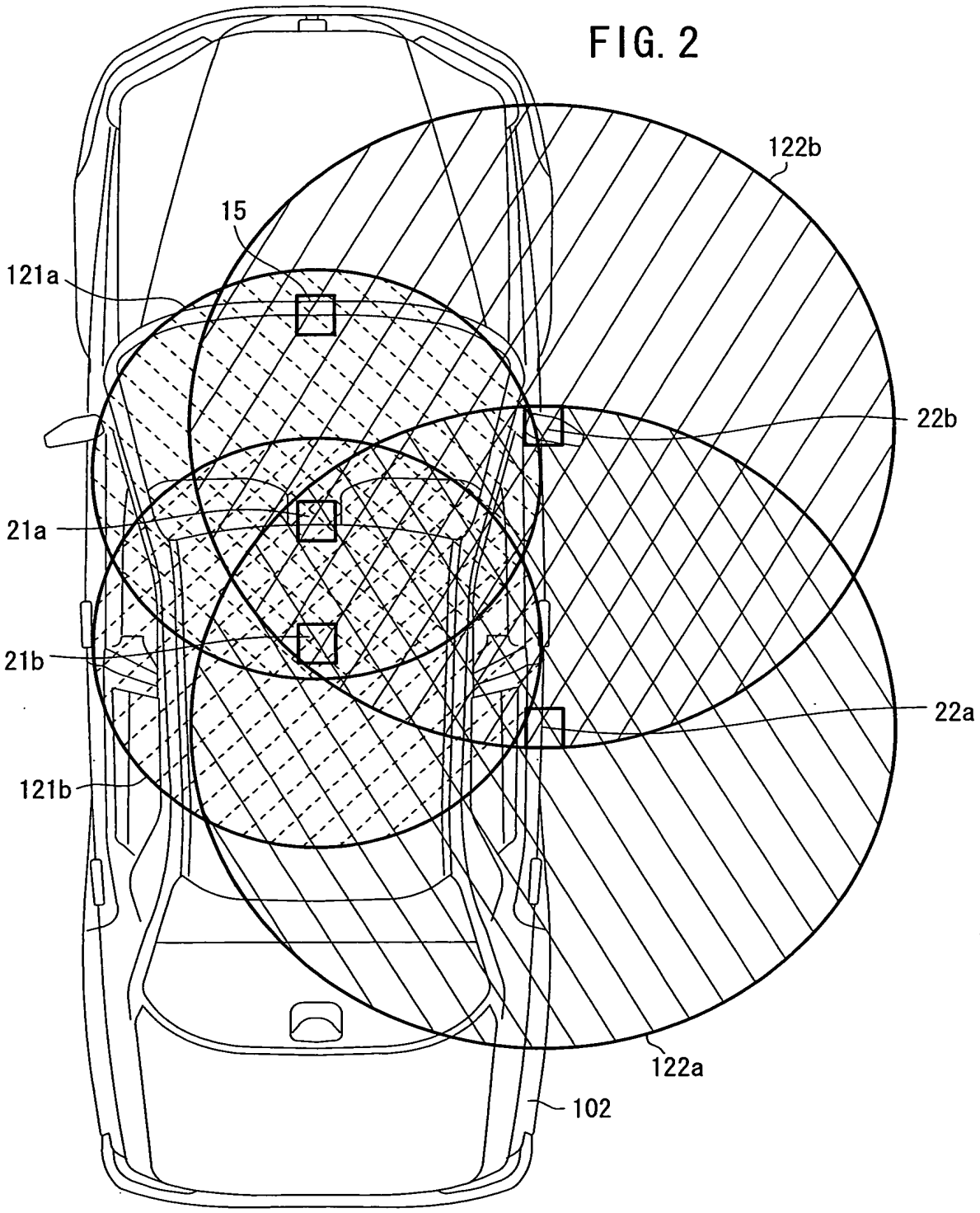


FIG. 3

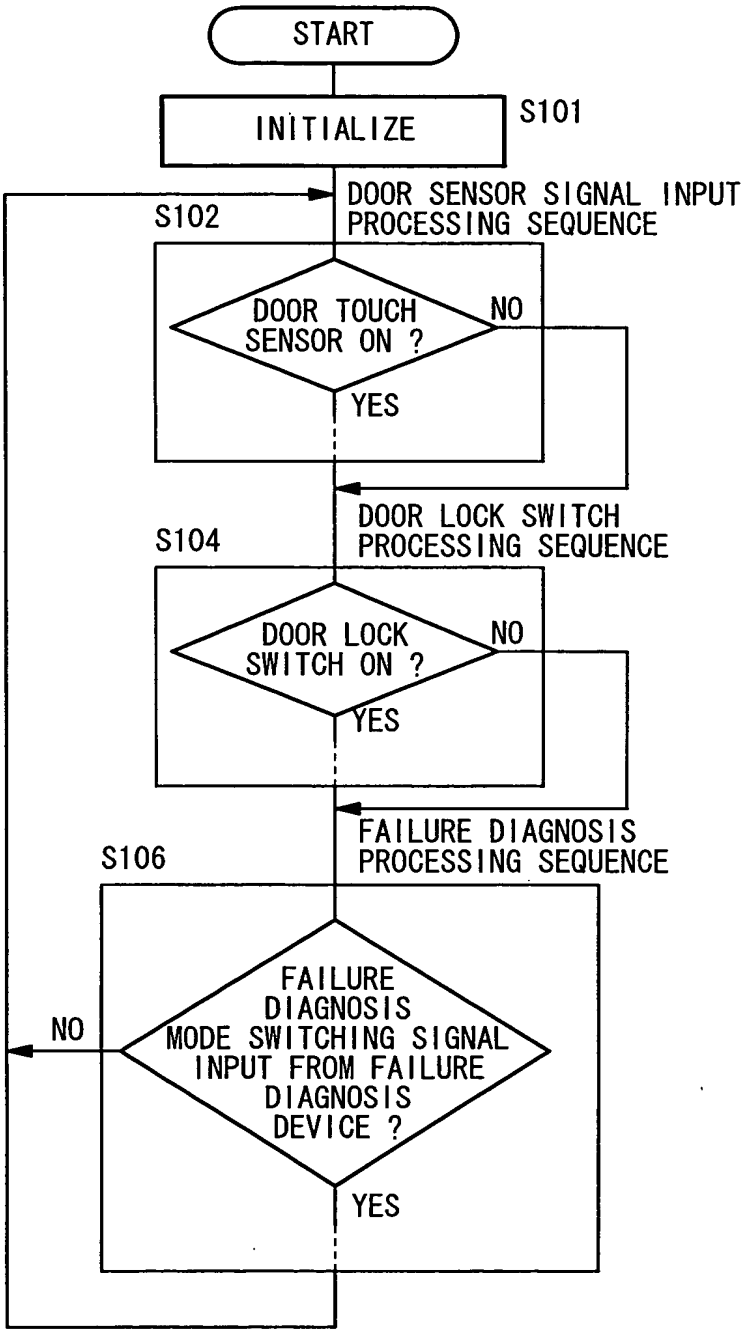

START
INITIALIZE
S101
DOOR SENSOR SIGNAL INPUT PROCESSING SEQUENCE
S102
DOOR TOUCH SENSOR ON ?
NO
YES
DOOR LOCK SWITCH PROCESSING SEQUENCE
S104
DOOR LOCK SWITCH ON ?
NO
YES
FAILURE DIAGNOSIS PROCESSING SEQUENCE
S106
FAILURE DIAGNOSIS MODE SWITCHING SIGNAL INPUT FROM FAILURE DIAGNOSIS DEVICE ?
NO
YES

FIG. 4

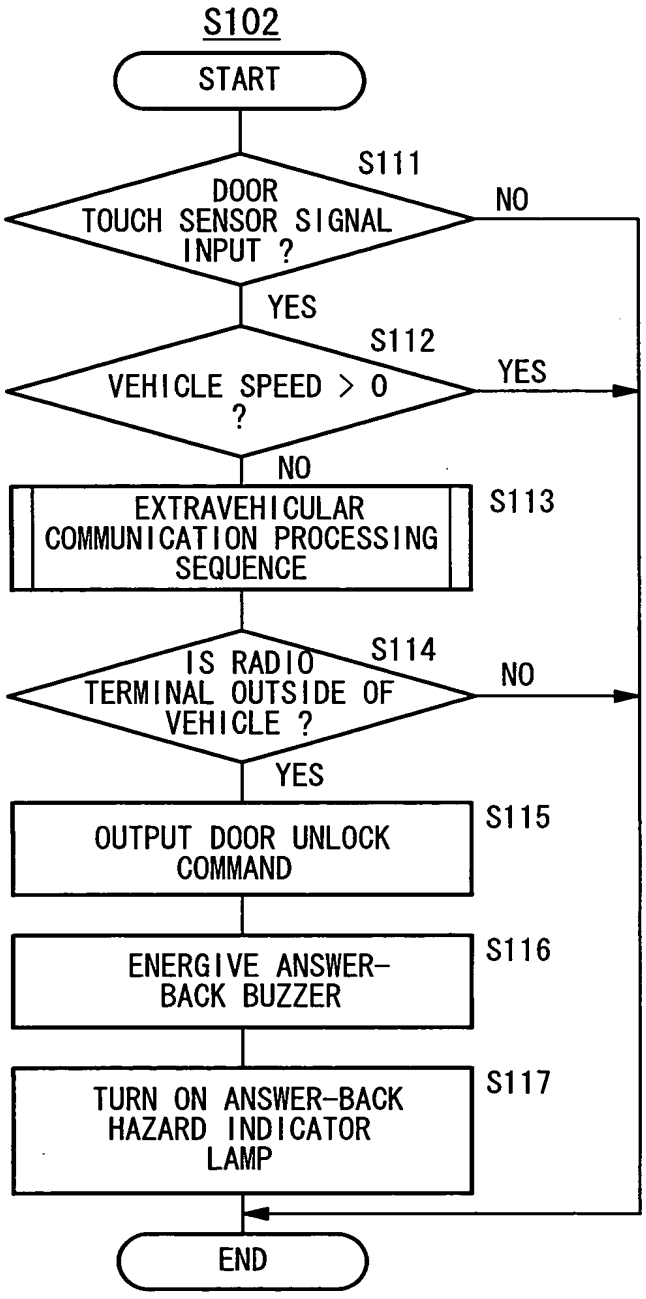

S102
START
S111
DOOR TOUCH SENSOR SIGNAL INPUT ?
NO
YES
S112
VEHICLE SPEED > 0 ?
YES
NO
EXTRAVEHICULAR COMMUNICATION PROCESSING SEQUENCE
S113
S114
IS RADIO TERMINAL OUTSIDE OF VEHICLE ?
NO
YES
OUTPUT DOOR UNLOCK COMMAND
S115
ENERGIVE ANSWER-BACK BUZZER
S116
TURN ON ANSWER-BACK HAZARD INDICATOR LAMP
S117
END

FIG. 5

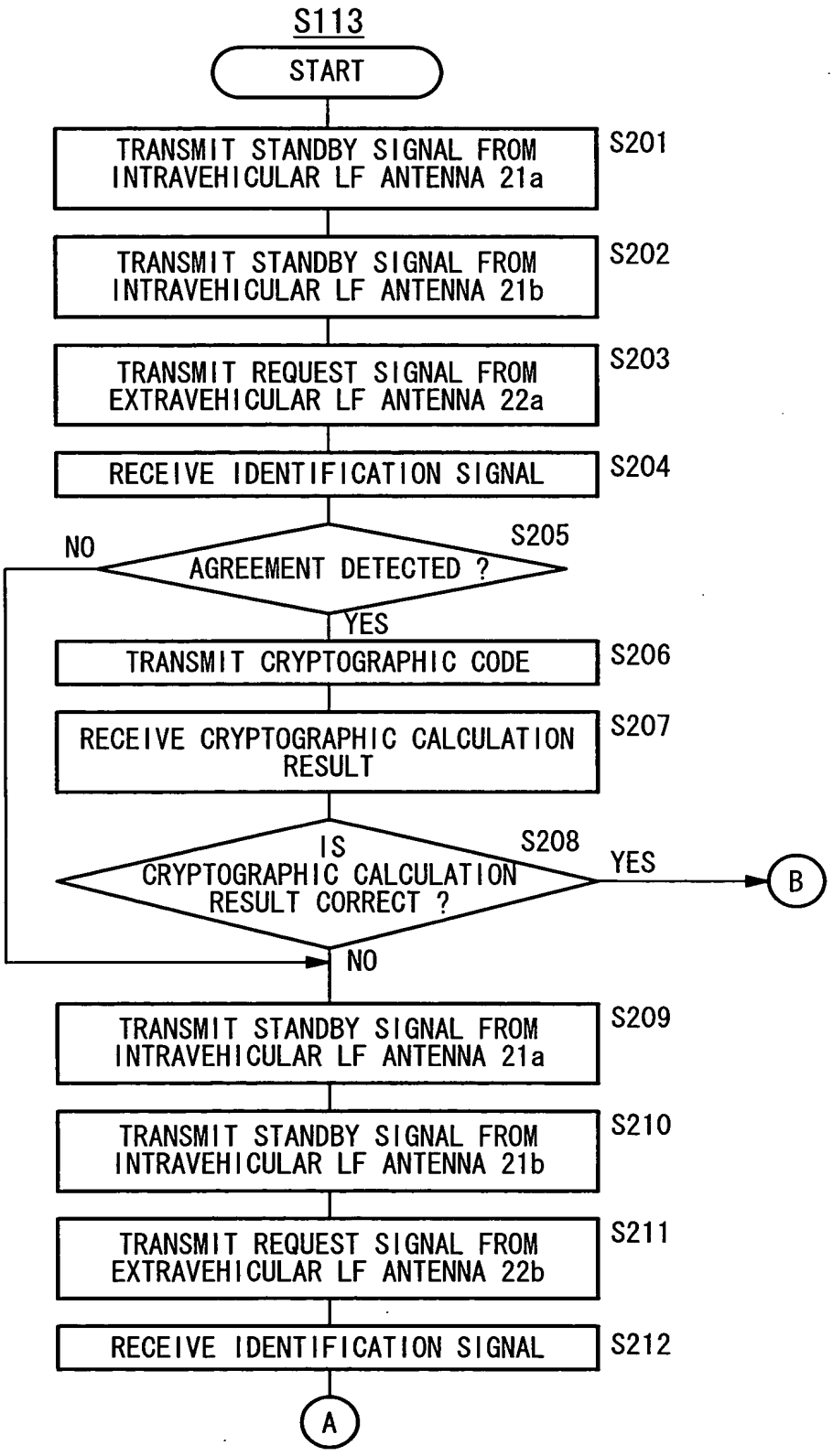

S113
START
TRANSMIT STANDBY SIGNAL FROM INTRAVEHICULAR LF ANTENNA 21a
S201
TRANSMIT STANDBY SIGNAL FROM INTRAVEHICULAR LF ANTENNA 21b
S202
TRANSMIT REQUEST SIGNAL FROM EXTRAVEHICULAR LF ANTENNA 22a
S203
RECEIVE IDENTIFICATION SIGNAL
S204
AGREEMENT DETECTED ?
S205
NO
YES
TRANSMIT CRYPTOGRAPHIC CODE
S206
RECEIVE CRYPTOGRAPHIC CALCULATION RESULT
S207
IS CRYPTOGRAPHIC CALCULATION RESULT CORRECT ?
S208
YES
B
NO
TRANSMIT STANDBY SIGNAL FROM INTRAVEHICULAR LF ANTENNA 21a
S209
TRANSMIT STANDBY SIGNAL FROM INTRAVEHICULAR LF ANTENNA 21b
S210
TRANSMIT REQUEST SIGNAL FROM EXTRAVEHICULAR LF ANTENNA 22b
S211
RECEIVE IDENTIFICATION SIGNAL
S212
A

FIG. 6

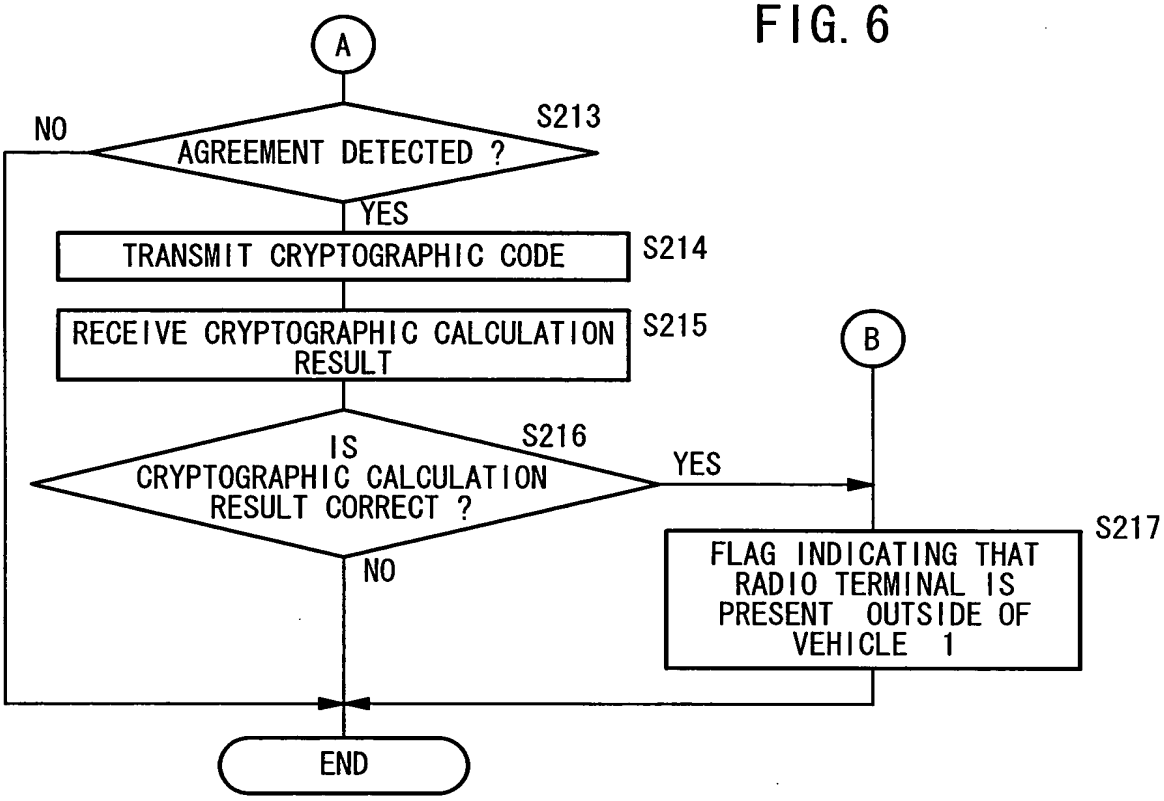

A
S213
NO
AGREEMENT DETECTED ?
YES
TRANSMIT CRYPTOGRAPHIC CODE
S214
RECEIVE CRYPTOGRAPHIC CALCULATION RESULT
S215
B
S216
IS CRYPTOGRAPHIC CALCULATION RESULT CORRECT ?
YES
NO
S217
FLAG INDICATING THAT RADIO TERMINAL IS PRESENT OUTSIDE OF VEHICLE 1
END

FIG. 7

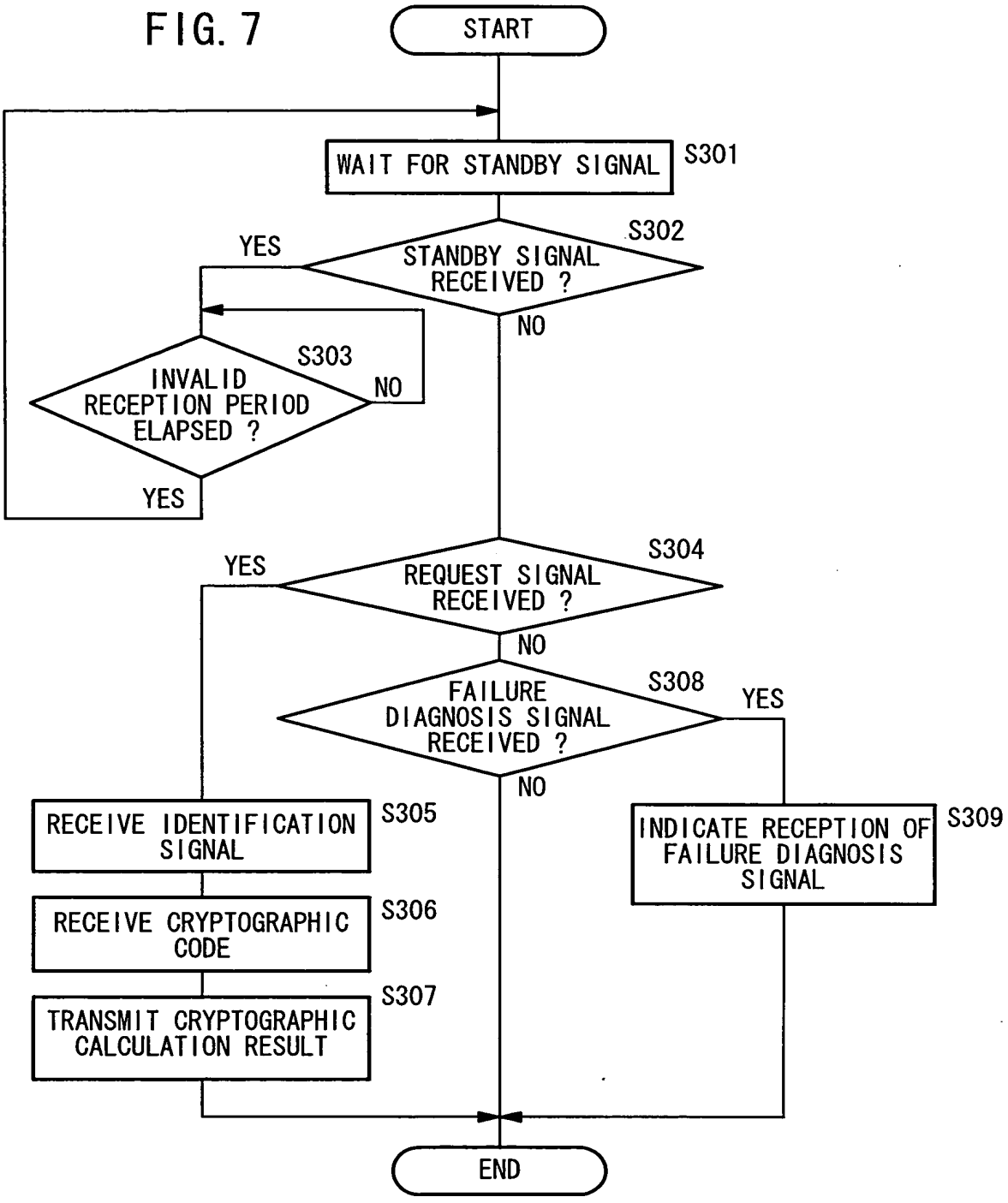

START
WAIT FOR STANDBY SIGNAL
S301
STANDBY SIGNAL RECEIVED ?
S302
YES
NO
INVALID RECEPTION PERIOD ELAPSED ?
S303
NO
YES
REQUEST SIGNAL RECEIVED ?
S304
YES
NO
FAILURE DIAGNOSIS SIGNAL RECEIVED ?
S308
YES
NO
RECEIVE IDENTIFICATION SIGNAL
S305
RECEIVE CRYPTOGRAPHIC CODE
S306
TRANSMIT CRYPTOGRAPHIC CALCULATION RESULT
S307
INDICATE RECEPTION OF FAILURE DIAGNOSIS SIGNAL
S309
END

FIG. 8

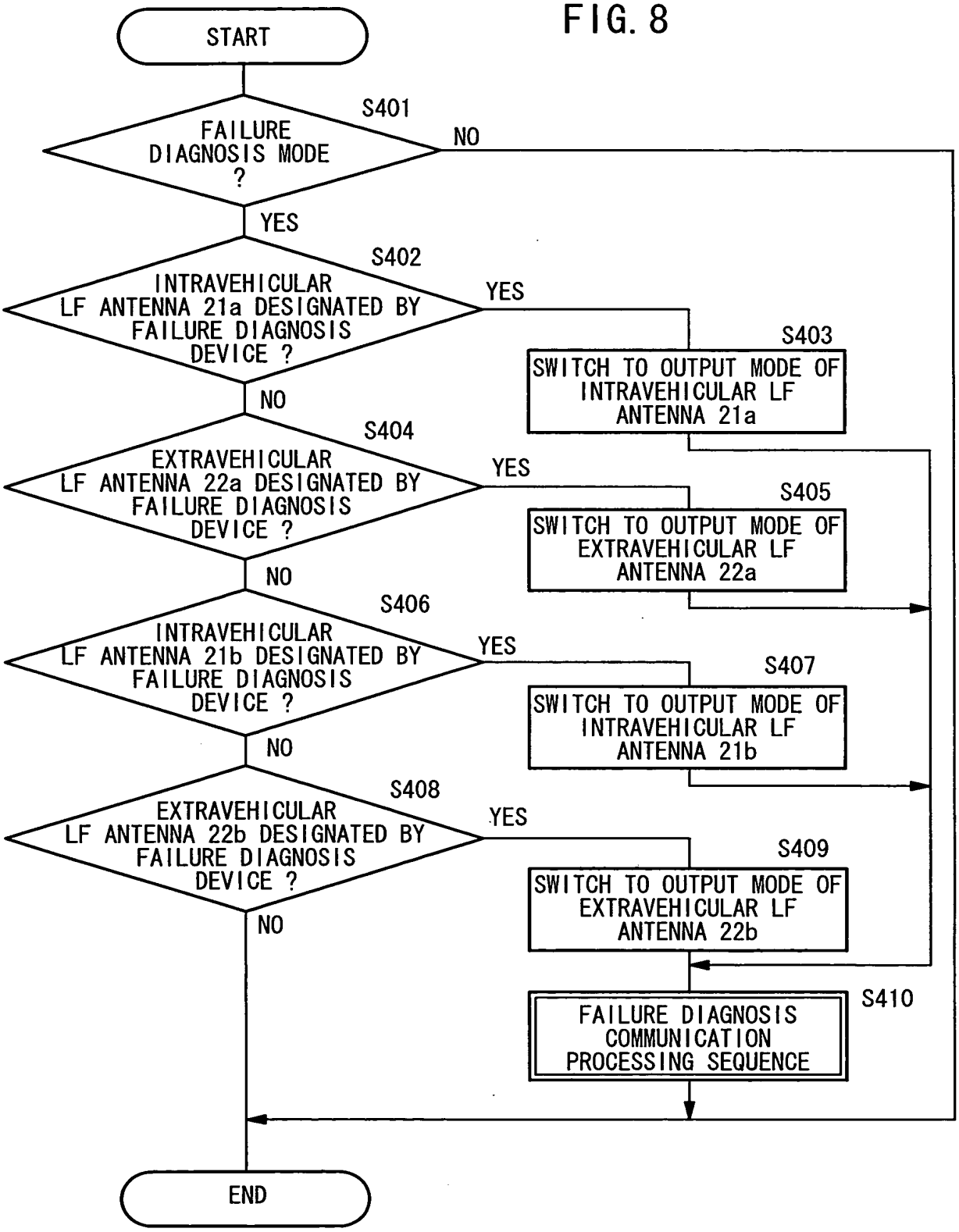
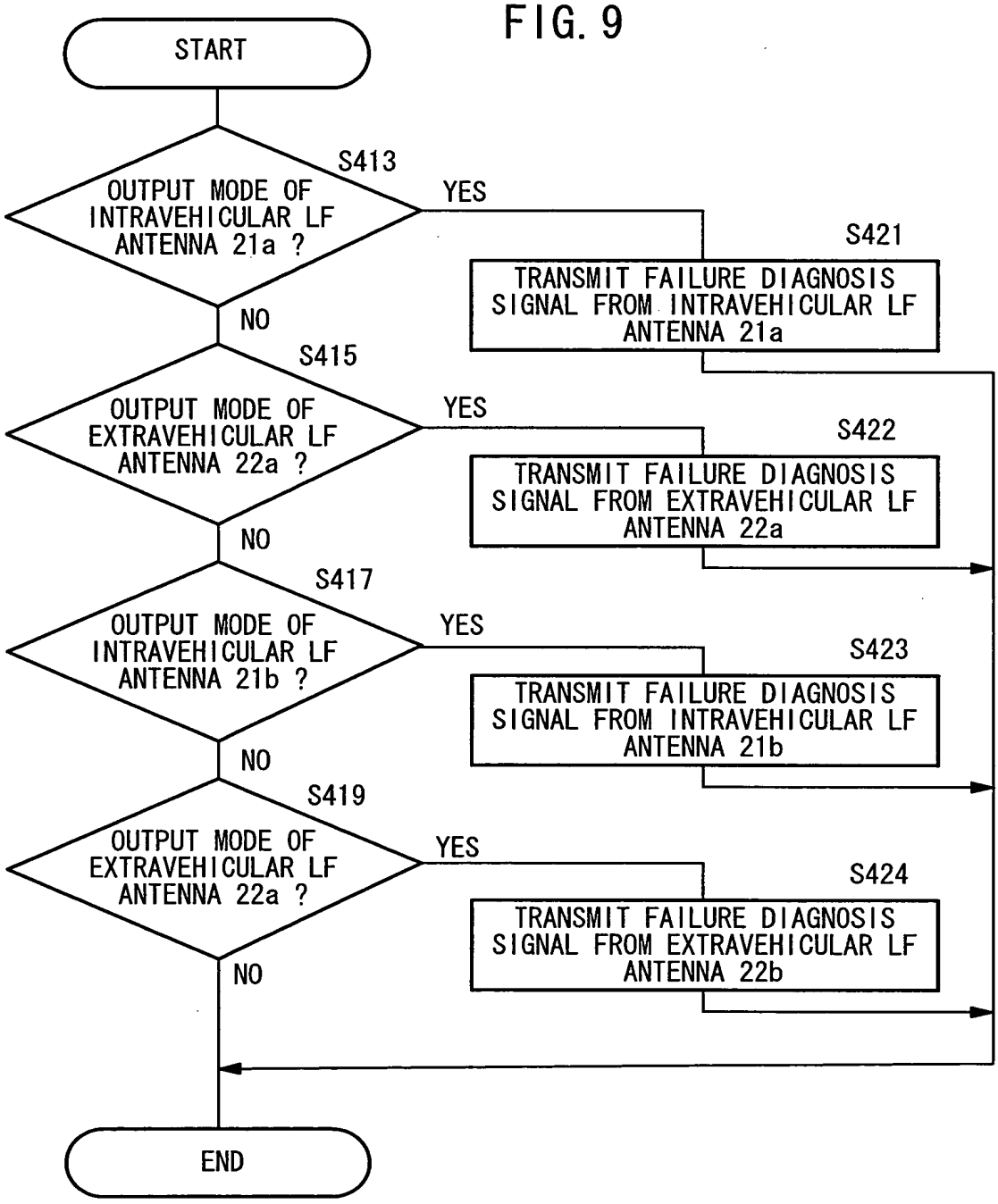

START
S401
FAILURE DIAGNOSIS MODE ?
NO
YES
S402
INTRAVEHICULAR LF ANTENNA 21a DESIGNATED BY FAILURE DIAGNOSIS DEVICE ?
YES
S403
SWITCH TO OUTPUT MODE OF INTRAVEHICULAR LF ANTENNA 21a
NO
S404
EXTRAVEHICULAR LF ANTENNA 22a DESIGNATED BY FAILURE DIAGNOSIS DEVICE ?
YES
S405
SWITCH TO OUTPUT MODE OF EXTRAVEHICULAR LF ANTENNA 22a
NO
S406
INTRAVEHICULAR LF ANTENNA 21b DESIGNATED BY FAILURE DIAGNOSIS DEVICE ?
YES
S407
SWITCH TO OUTPUT MODE OF INTRAVEHICULAR LF ANTENNA 21b
NO
S408
EXTRAVEHICULAR LF ANTENNA 22b DESIGNATED BY FAILURE DIAGNOSIS DEVICE ?
YES
S409
SWITCH TO OUTPUT MODE OF EXTRAVEHICULAR LF ANTENNA 22b
NO
S410
FAILURE DIAGNOSIS COMMUNICATION PROCESSING SEQUENCE
END

FIG. 9


START
S413
OUTPUT MODE OF INTRAVEHICULAR LF ANTENNA 21a ?
YES
S421
TRANSMIT FAILURE DIAGNOSIS SIGNAL FROM INTRAVEHICULAR LF ANTENNA 21a
NO
S415
OUTPUT MODE OF EXTRAVEHICULAR LF ANTENNA 22a ?
YES
S422
TRANSMIT FAILURE DIAGNOSIS SIGNAL FROM EXTRAVEHICULAR LF ANTENNA 22a
NO
S417
OUTPUT MODE OF INTRAVEHICULAR LF ANTENNA 21b ?
YES
S423
TRANSMIT FAILURE DIAGNOSIS SIGNAL FROM INTRAVEHICULAR LF ANTENNA 21b
NO
S419
OUTPUT MODE OF EXTRAVEHICULAR LF ANTENNA 22a ?
YES
S424
TRANSMIT FAILURE DIAGNOSIS SIGNAL FROM EXTRAVEHICULAR LF ANTENNA 22b
NO
END

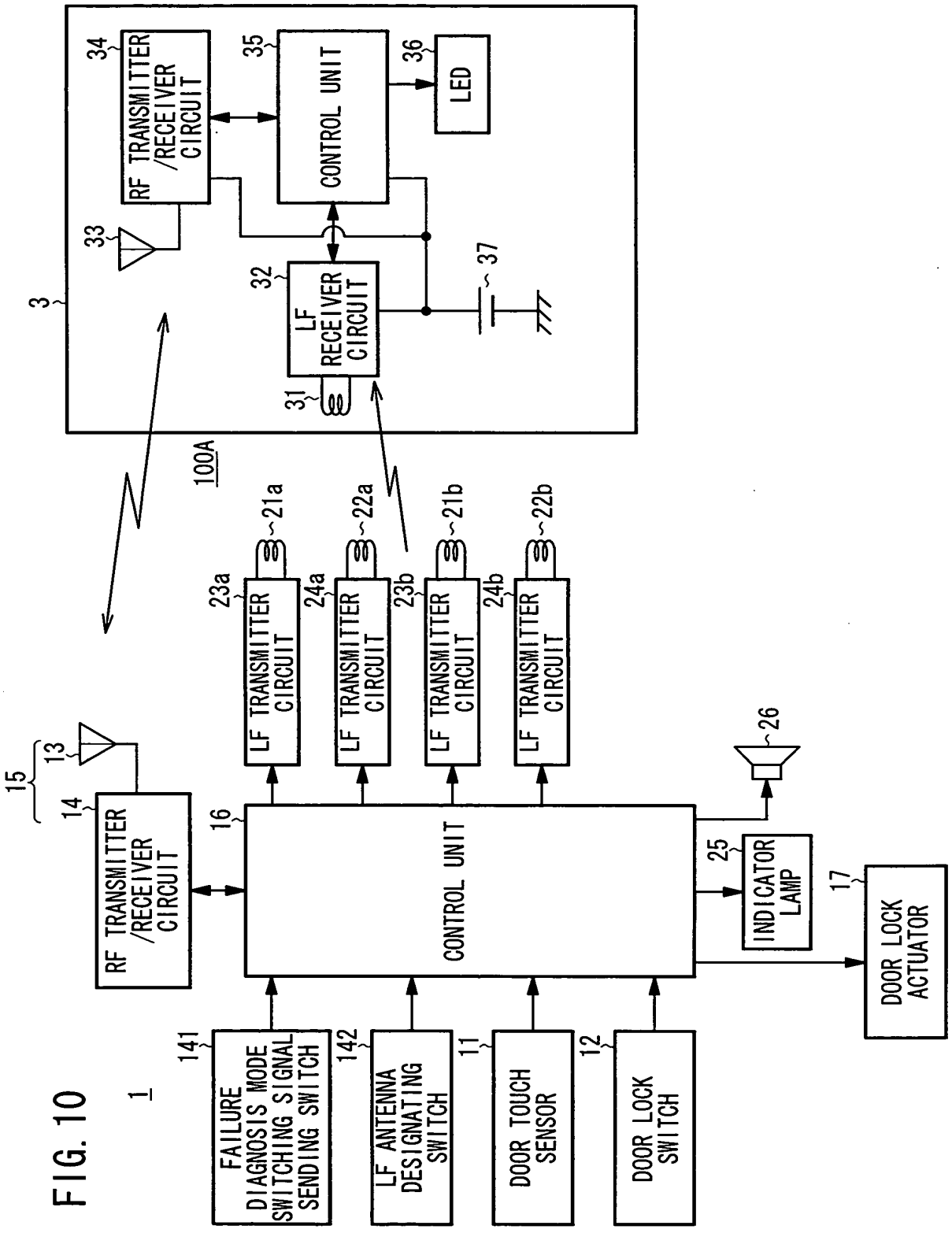

1
3
100A
RF TRANSMITTER /RECEIVER CIRCUIT
CONTROL UNIT
LED
LF RECEIVER CIRCUIT
LF TRANSMITTER CIRCUIT
RF TRANSMITTER /RECEIVER CIRCUIT
CONTROL UNIT
INDICATOR LAMP
DOOR LOCK ACTUATOR
FAILURE DIAGNOSIS MODE SWITCHING SIGNAL SENDING SWITCH
LF ANTENNA DESIGNATING SWITCH
DOOR TOUCH SENSOR
DOOR LOCK SWITCH

FIG. 10